
CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF
THE INVENTION TECHNICAL PROBLEM MEANS EXAMPLE DESCRIPTION OF
DRAWINGS DRAWINGS

* NOTICES *

JPO and INPIT are not responsible for any
damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1](A) A thermoplastic resin composition which blends (B) polypropylene terephthalate 0.1 - 100 weight sections to thermoplastics 100 weight section.

[Claim 2] The thermoplastic resin composition according to claim 1 whose thermoplastics is thermoplastic polyester other than polypropylene terephthalate.

[Claim 3] The thermoplastic resin composition according to claim 2 whose thermoplastic polyester is polyethylene terephthalate and/or polybutylene terephthalate.

[Claim 4] The thermoplastic resin composition according to claim 1 which are one sort or two sorts or more of mixtures in which thermoplastics is chosen from a group which consists of polyamide resin, polyphenylene sulfide resin, polyoxymethylene resin, polystyrene resin, and polystyrene system resin.

[Claim 5] The thermoplastic resin composition according to claim 4 whose polystyrene system resin is styrene / acrylonitrile copolymer, or acrylonitrile / butadiene / styrene copolymer.

[Claim 6] The thermoplastic resin composition according to any one of claims 1 to 5 in which glass transition temperature blends an elastomer 20 ** or less further to thermoplastics 100 weight section.

[Claim 7] The thermoplastic resin composition according to claim 6 whose elastomer 20 ** or less glass transition temperature is an olefin system elastomer.

[Claim 8] The thermoplastic resin composition according to claim 6 or 7 whose mean particle diameter of this disperse phase a disperse phase which consists of an elastomer with a glass transition temperature of 20 ** or less exists in a thermoplastics matrix phase, and is 20 microns or less.

[Claim 9] claims 1-5 which make it come further to thermoplastics 100 weight section to contain 0.01 to epoxy compound 30 weight section -- either -- a thermoplastic resin composition of a statement.

[Claim 10] The thermoplastic resin composition according to any one of claims 1 to 9

which blends five to filler 140 weight section further to thermoplastics 100 weight section.

[Claim 11]The thermoplastic resin composition according to claim 10 whose filler is glass fiber.

[Claim 12]A connector obtained by carrying out injection molding of the thermoplastic resin composition according to any one of claims 1 to 11.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention is excellent in mechanical properties, heat resistance, and a moldability, is especially excellent in an impact property and hydrolysis resistance, and relates to a resin composition suitable as a charge of connector material especially.

[0002]

[Description of the Prior Art]Since it excels in an impact property, heat resistance, chemical resistance, weatherability, and an electrical property, polyethylene terephthalate, polybutylene terephthalate or nylon 6, and the thermoplastics represented by Nylon 66 are used as connector section articles, such as a car, electrical and electric equipment, and electronic parts.

[0003]In recent years, the mold-goods material which can be equal to the use under a severe condition conventionally has been required with progress of the miniaturization and high integration in the microelectronics field.

[0004]However, when these thermoplastics was exposed under an elevated temperature and highly humid for a long time, crystallization, heat deterioration, or hydrolysis advanced gradually, toughness fell, and it had the fault that mold goods broke easily. For this reason, the actual condition is that use is restricted in the use for which the endurance under an elevated temperature and highly humid is needed.

[0005]How to blend with polyester resin the aromatic polycarbonate shown in JP,60-231757,A etc., and a glycidyl group content copolymer as a means to solve such a problem, The method of blending the vinyl system polymer and glycidyl group content vinyl system copolymer which are shown in JP,57-100154,A etc. is indicated. The method of blending denaturation polyolefine is indicated by JP,61-283653,A.

[0006]

[Problem(s) to be Solved by the Invention]However, the method indicated by JP,60-231757,A and JP,57-100154,A was not enough as impact strength and the improvement effect of hydrolysis resistance. By the method currently indicated by JP,61-283653,A, although surely shock resistance was improved to some extent, it had the problem that initial stiffness was low.

[0007]

[Means for Solving the Problem]As a result of inquiring wholeheartedly that an aforementioned problem should be solved, this invention persons by blending

polypropylene terephthalate with thermoplastics, It found out excelling in heat resistance, shock resistance, and hydrolysis resistance, and even if it neglected a connector produced by fabricating a resin composition which blends polypropylene terephthalate further under an elevated temperature and highly humid, it found out that destruction of mold goods did not take place easily, and reached this invention.

[0008]Namely, this invention receives (1) (A) thermoplastics 100 weight section, (B) A thermoplastic resin composition which blends 0.1 to polypropylene terephthalate 100 weight section, (2) The above-mentioned thermoplastic resin composition whose thermoplastics is thermoplastic polyester other than polypropylene terephthalate, (3) The above-mentioned thermoplastic resin composition whose thermoplastic polyester is polyethylene terephthalate and/or polybutylene terephthalate, Thermoplastics (4) Polyamide resin, polyphenylene sulfide resin, The above-mentioned thermoplastic resin composition which are one sort or two sorts or more of mixtures chosen from a group which consists of polyoxymethylene resin, polystyrene resin, and polystyrene system resin, (5) As opposed to above-mentioned thermoplastic resin composition and (6) thermoplastics 100 weight section whose polystyrene system resin is styrene / acrylonitrile copolymer, or acrylonitrile / butadiene / styrene copolymer, In the above-mentioned thermoplastic resin composition whose elastomer 20 ** or less is the above-mentioned thermoplastic resin composition in which glass transition temperature blends an elastomer 20 ** or less further and whose (7) glass transition temperature is olefin system elastomers, and (8) thermoplastics matrix phase, A disperse phase which consists of an elastomer with a glass transition temperature of 20 ** or less exists, The above-mentioned thermoplastic resin composition whose mean particle diameter of this disperse phase is 20 microns or less, (9) The above-mentioned thermoplastic resin composition which makes it come further to thermoplastics 100 weight section to contain 0.01 to epoxy compound 30 weight section, (10) It is a connector obtained by carrying out injection molding of the above-mentioned thermoplastic resin composition which blends five to filler 140 weight section further, the above-mentioned thermoplastic resin composition whose (11) fillers are glass fiber, and the (12) above-mentioned thermoplastic resin composition to thermoplastics 100 weight section.

[0009]

[Embodiment of the Invention]The resin composition of this invention is explained concretely below.

[0010]The thermoplastics (A) of this invention is a synthetic resin which shows mobility when it heats, and can carry out a fabricating operation using this. As this example, for example Polyester resin other than polypropylene terephthalate, Liquid crystal polyester resin, polycarbonate resin, polyamide resin, polyphenylene oxide resin, Polyphenylene sulfide resin, polyoxymethylene resin, phenoxy resin, Polyolefin system resin, such as polypropylene resin and polyethylene, ethylene/propylene resin, Ethylene / 1-butene resin, ethylene / propylene / nonconjugated diene resin, Ethylene / ethyl acrylate resin, ethylene / glycidyl methacrylate resin body, Ethylene / vinyl acetate / glycidyl methacrylate resin, ethylene / vinyl acetate / glycidyl methacrylate resin, Ethylene / propylene-g-maleic anhydride resin, polystyrene resin, Polystyrene system resin, such as styrene/acrylonitrile copolymer, acrylonitrile / butadiene / styrene copolymer (ABS plastics), Although elastomers, such as a polyester polyether elastomer and a polyester polyester elastomer, or two or more sorts of mixtures of these thermoplastics are mentioned, polyester resin

other than polypropylene terephthalate, polyamide resin, polycarbonate resin, Phenoxy resin, polyphenylene sulfide resin, phenol resin, Polyoxymethylene resin, polystyrene resin, styrene/acrylonitrile copolymer, One sort or two sorts or more of mixtures chosen from polystyrene system resin, such as acrylonitrile / butadiene / styrene copolymer (ABS plastics), desirable still more preferably, Polyester resin other than polypropylene terephthalate, polyamide resin, Polyphenylene sulfide resin, polyoxymethylene resin, polystyrene resin, It is one sort or two sorts or more of mixtures chosen from polystyrene system resin, such as styrene/acrylonitrile copolymer, acrylonitrile / butadiene / styrene copolymer (ABS plastics), and especially good **** are polyester resin other than polypropylene terephthalate.

[0011]As polyester resin, among the above-mentioned thermoplastics (A), It is polyester resin other than polypropylene terephthalate, and dicarboxylic acid, the polycondensation thing of glycol, the ring-opening-polymerization thing of annular lactone, the polycondensation thing of hydroxycarboxylic acid and dibasic acid, the polycondensation thing of glycol, etc. are mentioned substantially. Specifically Polyethylene terephthalate resin, polybutylene terephthalate resin, The others which are polyethylenenaphthalate resin, polybutylene naphthalate resin, polycyclohexane-dimethylene-terephthalate resin and the polyethylene 1,2-bis(phenoxy)ethane- 4, 4'-dicarboxylate resin, etc., The others which are the polyethylene 1,2-bis(phenoxy)ethane- 4, 4'-dicarboxylate resin, etc., Polyethylene isophthalate / terephthalate resin, polybutylene terephthalate / isophthalate resin, Copolymers and mixtures, such as polybutylene terephthalate / Deccan dicarboxylate resin, and polycyclohexane dimethylene terephthalate/isophthalate resin, can be mentioned. As suitable polyester resin especially for this invention, they are polyethylene terephthalate resin and polybutylene terephthalate resin.

[0012]There is no restriction in particular in the molecular weight of such polyester resin. usually -- although the intrinsic viscosity measured at 25 ** using the mixed solvent of phenol / tetrachloroethane 1:1 can use the thing of 0.10-3.00 -- desirable -- 0.25-2.50 -- it is 0.40-2.25 especially preferably.

[0013]As polyamide resin, among the above-mentioned thermoplastics (A), For example, the ring-opening-polymerization thing of annular lactam, the polycondensation thing of aminocarboxylic acid, The polycondensation thing of dibasic acid and diamine, etc. are mentioned and specifically Aliphatic polyamide, such as nylon 6, Nylon 66, Nylon 46, Nylon 610, Nylon 612, Nylon 11, and Nylon 12, Poly (meta xylene adipamide) (it abbreviates to MXD and 6 below), poly (hexamethylphthalamide) (it omits the following 6T), Poly (hexamethylene isophthalamide) (it omits the following 6I), poly (tetramethyleneisophthalamide) (it omits the following 4I), Aliphatic series-aromatic polyamide, and these copolymers and mixtures, such as poly(nonamethyleneterephthalamido) (it omits the following 9T), can be mentioned. As suitable polyamide especially for this invention, nylon 6 T/Nylon 66 /nylon 6, Nylon 66, nylon 6/66, and 6T, nylon 6 T/12, and 6I, nylon 6 T/6I/12, nylon 6 T/610, and nylon 6 T / 6I/6 can be mentioned.

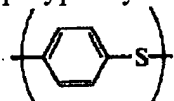
[0014]There is no restriction in particular in the molecular weight of such polyamide resin. although 1% of concentration and the relative viscosity measured at 25 ** can use the thing of 1.70-4.50 among 98% sulfuric acid -- desirable -- 2.00-4.00 -- it is 2.00-3.50 especially preferably.

[0015]As polystyrene system resin, the polymer blend object of polystyrene, styrene /

acrylonitrile copolymer, rubber modified styrene resin, rubber modified styrene resin, and polyphenylene ether, etc. are mentioned among the above-mentioned thermoplastics (A).

[0016]The rubber modified styrene resin refers to the graft polymer which a rubber-like polymer distributes in the shape of a particle in the matrix which consists of a vinylaromatic system polymer here, This and a copolymerizable vinyl monomer are added an aromatic vinyl monomer and if needed under existence of a rubber-like polymer, and a monomeric mixture is obtained publicly known mass polymerization, massive suspension polymerization, solution polymerization, or by carrying out an emulsion polymerization.

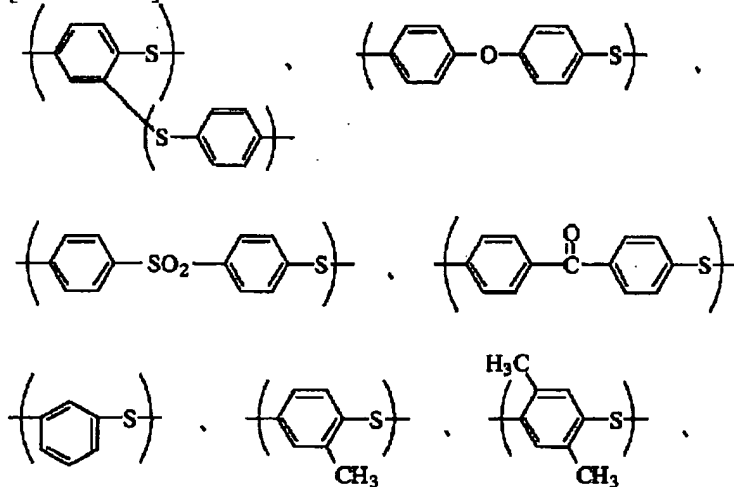
[0017]The repeating unit substantially expressed with the following structural formula as polyphenylene sulfide resin among thermoplastics (A), [Formula 1]



Resin which consists of more than 70 mol % and a polymer which contains more than 90 mol % more preferably is expressed. Polyphenylene sulfide resin can constitute less than [of the repeating unit / 30 mol %] from a repeating unit which has the following structural formula.

[0018]

[Formula 2]



If melt kneading is possible for the melt viscosity of such polyphenylene sulfide resin, there will be no restriction in particular, but a 50-20000 P (320-degree and 10 sec of shear rate-1) thing is usually used.

[0019]Polyoxymethylene resin means a oxymethylene homopolymer and the oxymethylene copolymer which mainly consists of a oxymethylene unit and contains the oxyalkylene unit of at least one sort of carbon numbers 2-8 in a polymer molecule among the above-mentioned thermoplastics (A).

[0020]Although there is no restriction in particular in the molecular weight of such polyoxymethylene resin, it measures by GPC (gel permeation chromatography), the number average molecular weight converted by standard poly methyl methacrylate -- 10,000-500,000 -- desirable -- 15,000-100,000 -- the thing of 20,000-50,000 is used especially preferably.

[0021] Although polypropylene terephthalate (B) of this invention points out thermoplastic polyester resin which used terephthalic acid for an acid component and in which it used 1,3-propylene glycol for a glycol component, In addition, isophthalic acid, alt.phthalic acid, naphthalene-dicarboxylic-acid, oxalic acid, adipic acid, 1, and 4-cyclohexanedicarboxylic acid etc. as an acid component in the range which does not spoil the purpose of this invention as a glycol component, Some ethylene oxide additions of ethylene glycol, 1,4-butanediol, 1,6-hexanediol, 1,4-cyclohexane dimethanol, and bisphenol A, etc. can be used.

[0022] If the amount of copolymerization in a case of carrying out copolymerization is a range which does not spoil the purpose of this invention, there will be no restriction in particular, but it is preferred that they are usually less than 30 mol % of an acid component or less than 30 mol % of a glycol component.

[0023] There is no restriction in particular in a molecular weight of such polyester resin. usually -- although intrinsic viscosity (dl/g) measured at 25 ** using a mixed solvent of phenol / tetrachloroethane 1:1 can use a thing of 0.10-3.00 -- desirable -- 0.25-2.50 -- it is 0.40-2.25 especially preferably.

[0024] The thermoplastic resin composition of this invention can raise intensity, rigidity, heat resistance, etc. substantially by adding a filler further. Since an adhesive property with a filler improved substantially by using together polypropylene terephthalate and a filler of this invention especially, compared with a resin composition which blended a filler with thermoplastics, it turned out that intensity and a rigid and heat-resistant improved effect are very large.

[0025] As an example of such a filler, glass fiber, carbon fiber, a metal fiber, An aramid fiber, asbestos, a potassium titanate whisker, a boric acid aluminum whisker, Huaras Tena Ito, a glass flake, a glass bead, titanium oxide, an aluminum oxide, etc. are mentioned, and chopped strand type glass fiber is used preferably especially.

[0026] 5 - 140 weight section is desirable especially preferred to thermoplastics (A) 100 weight section, and these additions are 5 - 100 weight sections.

[0027] The thermoplastic resin composition of this invention can improve an impact property further, if glass transition temperature adds an elastomer 20 ** or less further.

[0028] If glass transition temperature is an elastomer 20 ** or less, there will be no restriction in particular, but. An olefin system elastomer, a nylon system elastomer, a polyester system elastomer, A polyester polyether system elastomer, a polyester polyester system elastomer, a polyester polyamide system elastomer etc. -- desirable -- further -- desirable -- a polyester polyether system elastomer and an olefin system elastomer -- it is an olefin system elastomer especially preferably. As an example of such an olefin system elastomer, Ethylene/propylene copolymer, ethylene / 1-butene copolymer, ethylene / propylene / conjugated diene copolymer, Ethylene/ethyl acrylate copolymer, ethylene/methacrylic acid copolymer, Ethylene / glycidyl methacrylate copolymer, ethylene / vinyl acetate / glycidyl methacrylate copolymer, Ethylene / ethyl acrylate g-maleic anhydride copolymer, ethylene / methyl methacrylate g-maleic anhydride copolymer, Ethylene / ethyl acrylate g-maleimide copolymer, ethylene / ethyl acrylate g-N-phenylmaleimide copolymer, Ethylene / propylene-g-maleic anhydride copolymer, ethylene / butene-1-g-maleic anhydride copolymer, Ethylene / propylene / 1,4-hexadiene g-maleic anhydride copolymer, Ethylene / propylene / dicyclopentadiene g-maleic anhydride copolymer, ethylene / propylene / 2,5-norbornadiene g-maleic anhydride

copolymer, ethylene / propylene-g-N-phenylmaleimide copolymer, styrene/maleic anhydride copolymer, Styrene / butadiene / styrene g-maleic anhydride block copolymer, After hydrogenating styrene / butadiene / styrene block copolymer, The styrene ethylene / butylene styrene g-maleic anhydride block copolymer produced by graft-izing a maleic anhydride, Styrene / isoprene g-maleic anhydride block copolymer, ethylene / acrylic acid ionomer, ethylene / methacrylic acid ionomer, ethylene / itaconic acid ionomer, etc. can be mentioned, and these can be respectively independent or can be used in a form of a mixture.

[0029]Such an olefin system elastomer, It aims at raising compatibility with polypropylene terephthalate resin, A denaturation polyolefin elastomer which a kind of functional group combined with the inside of a polymer molecule or polymer terminals chemically at least among a hydroxyl group, a carboxylic acid group, a carboxylate group, a carboxylic metal base, carboxylic anhydride groups, an imido group, etc. can also be used.

[0030]In this invention, an addition of an elastomer 20 ** or less is usually one to 100 weight section to polypropylene-terephthalate-resin 100 weight section, and glass transition temperature is five to 80 weight section still more preferably three to 90 weight section preferably.

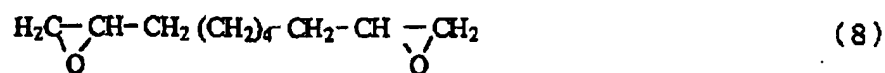
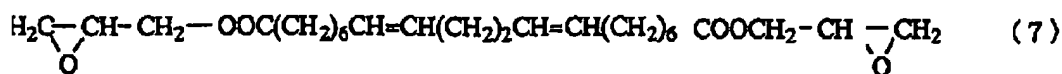
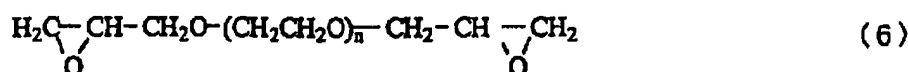
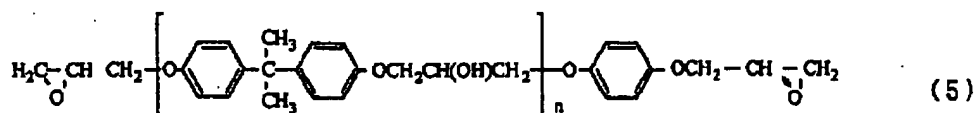
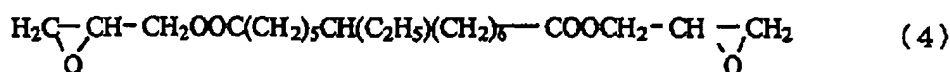
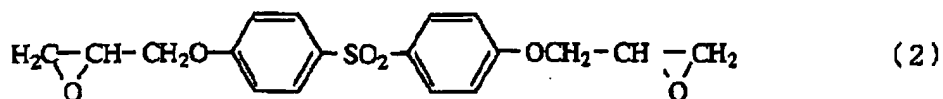
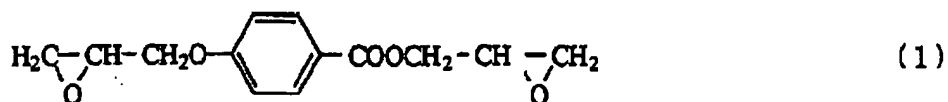
[0031]When using an elastomer in small quantities comparatively especially, in the case of 20 or less weight sections, 50 or less weight sections of elastomers [30 or less weight sections of] in a resin composition exist as a disperse phase in polypropylene terephthalate resin as a matrix preferably especially. In order for mold goods obtained with a constituent of this invention to hold more outstanding impact strength, it is desirable to carry out micro-disperse. Although there is a method of making particle diameter of a disperse phase a rate scale as one of the methods which evaluates the mixed state in a resin composition, when blending an elastomer with a resin composition of this invention, 15 microns or less are desirable still more preferred, and a distributed average of elastomer parts is 10 microns or less.

[0032]The thermoplastic resin composition of this invention can blend an epoxy compound further for the purpose of improvement in the impact property of a thermoplastic resin composition, and hydrolysis resistance.

[0033]If it is an epoxy compound which contains an epoxy group among a molecule as such an epoxy compound, there will be no restriction in particular, but a mono epoxy compound, a diepoxy compound, and a triepoxy compound are preferred, and can use especially a diepoxy compound preferably. As such a diepoxy compound, a diepoxy compound concretely expressed with a following general formula (1), (2), (3), (4), (5), (6), (7), and (8) can be used.

[0034]

[Formula 3]



(n expresses one or more integers.)

[0035]the addition of such an epoxy compound receives thermoplastics 100 weight section -- usually -- it is 0.03 to 20 weight section still more preferably 0.02 to 25 weight section preferably 0.01 to 30 weight section.

[0036]When the thermoplastic resin composition of this invention added the nucleus agent further, it was found out that heat resistance and hydrolysis resistance improve

further. If it is a compound which promotes crystallization of a thermoplastic resin composition as a nucleus agent, there will be no restriction in particular, but, Talc, mica, kaolin, silica, clay, a metallic oxide, carbonate, sulfate, an organic-carboxylic-acid salt, an organic-sulfonic-acid salt, etc. are used preferably, and talc, mica, and kaolin can use it preferably especially in these. the addition of a nucleus agent usually receives thermoplastics 100 weight section -- usually -- it is 0.03 to 10 weight section still more preferably 0.02 to 15 weight section preferably 0.01 to 20 weight section.

[0037]In the range which does not spoil the purpose of this invention to a thermoplastics resin composition of this invention, a hindered phenol system, antioxidants, such as the Lynn system and a sulfur system antioxidant, and a thermostabilizer and an ultraviolet ray absorbent (for example, resorcinol.) lubricant, such as salicylate, benzotriazol, and benzophenone, and a release agent (montanic acid and its salt.) The ester, its half ester, stearyl alcohol, Stera AMAIDO, an ethylene wax, etc., One or more sorts of usual additive agents, such as coloration inhibitor (phosphite, hypophosphite, etc.), a plasticizer, a halogen series flame retardant, a phosphorus series flame retardant, a spray for preventing static electricity, and colorant (a cadmium sulfide, phthalocyanine, etc.) containing a color and paints, can be added.

[0038]A thermoplastic resin composition of this invention is usually manufactured by a publicly known method. For example, an extrusion machine etc. are supplied without carrying out preliminary mixing and driving (A) thermoplastics, (B) polypropylene terephthalate, and other required additive agents again, and it is prepared by carrying out melt kneading enough in a temperature requirement (150 ** - 350 **). In this case, for example, since a single screw extruder provided with a "uni-melt" type screw, two axes, a triaxial extrusion machine, a kneader type kneading machine, etc. can be used and especially an aspect ratio is controlled, some kneading elements may be inserted in a screw. Since melt molding is possible for a thermoplastic resin composition of this invention, extrusion molding, injection molding, press forming, etc. are possible for it, and it can be fabricated and used for a film, a pipe, and a rod, arbitrary shape to wish and mold goods with a size. Especially, it is suitable for especially an injection-molded product use, and For example, various gear, various cases, A sensor, a LED lamp, a connector, a socket, a resistor, a relay case, A switch, a coil bobbin, a capacitor, a variable condenser case, an optical pickup, A radiator, various tag blocks, a transformer, a plug, a printed wired board, a tuner, A speaker, a microphone, headphone, a size motor, a magnetic head base, A power module, housing, a semiconductor, liquid crystal display parts, a FDD carriage, A FDD chassis, an HDD part article, a motor brush electrode holder, a parabolic antenna, An electric electronic component represented by computer associated part etc.; A VTR part article, Television parts, an iron, a hair drier, rice cooker parts, microwave oven parts, Audio apparatus parts, such as an acoustic component and an audio laser disc compact disk, A home represented by a lighting part, refrigerator parts, air-conditioner parts, typewriter parts, word processor parts, etc., Various bearings, such as a clerical work electric product part, office computer associated part, telephone associated part, facsimile associated part, copying machine associated part, jig for washing, oilless bearing, and stern bearing, and submerged bearing, a motor part article, A machinery associated part, a microscope which are represented by a writer, typewriter, etc., An optical instrument, a precision instrument associated part which are represented by binoculars, a camera, clock, etc., An AC-dynamo terminal, an AC-dynamo connector,

an I.C. regulator, Various valves, such as a potentiometer base for light DIYA, and an exhaust air gas valve, A fuel relation, an exhaust system and suction system various pipes, an air intake nozzle snorkel, An intake manifold, a fuel pump, engine-cooling-water joint, Carburetor main body, a carburetor spacer, an exhaust gas sensor, A cooling water sensor, an oil temperature sensor, a brake pad wear sensor, A throttle position sensor, a crankshaft position sensor, An air flow meter, a brake bat wear sensor, a thermostat base for air-conditioners, A heating warm air flow control valve, a brush electrode holder for radiator motors, A water pump impeller, turbine ** yne, windshield-wiper-motor relation parts, DEYUSUTORIBYUTA, a starting switch, a starter relay, wire harness for transmission, a window OSSHA nozzle, an air conditioning panel switch board, A coil for fuel relation electromagnetism valves, a connector for fuses, horn terminals, An electric equipment article electric insulating plate, a stepping motor rotor, a lamp socket, a lamp reflector, It is useful to various applications, such as a lamp housing, a brake piston, a solenoid bobbin, an engine oil filter, an ignition case, a play appliance implement, a toiletries article, an amusement article, a toy article, a chemical processing plant, and aeronautical-navigation parts. Although it can use useful especially taking advantage of the feature of this invention as housing and those parts, such as machine mechanism parts, an electric electronic component, autoparts, OA equipment, and electrical household appliances and electrical equipment, in the above, it can be especially used preferably as a charge of connector material which can demonstrate an effect of this invention.

[0039]

[Example]An example explains the effect of this invention still in detail below. However, this invention is not limited to these examples at all.

[0040]The used thermoplastics and its combination drug are as follows.

[0041]- PBT (polybutylene terephthalate) : Toray Industries PBT1100s (made by Toray Industries, Inc.)

- PET (polyethylene terephthalate) : diagram alloy TW90E (made by Mitsubishi Rayon Co., Ltd.)

- N6 (polyamide 6) : Amilan CM1010 (made by Toray Industries, Inc.)

- ABS (ABS plastics) : TOYORAKKU (Type 100) (made by Toray Industries, Inc.)

- PPS (polyphenylene sulfide resin) : TORERINA L2120 (made by the Toray Industries PPS company)

- POM (polyoxymethylene resin) : Duracon M90-44 (product made from Polyp Lastic)

Various characteristics were measured by the following methods.

[0042]- Tensile strength : ASTM D-638 was followed.

[0043]- The rate of bending flexibility : it applied to ASTM D790 correspondingly.

[0044]- Eye ZODDO impact test : it applied to ASTM D256 correspondingly.

[0045]- Load deflection temperature : according to ASTM D648, the load deflection temperature in load 1.82MPa was measured.

[0046]- Hydrolysis resistance : the tensile strength of the sample which neglected the test piece for tensile test under 121 ** and 100RH% for 30 hours was measured, and tensile strength retention was computed after strength retention = processing / from x100 before processing (%).

[0047]Into reference example 1 <manufacture of polypropylene terephthalate> 51.

autoclave, 2.0 kg of terephthalic acid and 1.3 kg of 1,3-propylene glycol were measured,

and it was set as the autoclave internal temperature of 180 **. When it became an internal temperature of 120 **, after adding 2.0 g of titaniumtetrabutoxide, and 2.0 g of monohydroxytin oxide, it agitated with the internal temperature of 180 ** for 1 hour. Then, while carrying out temperature up to 250 ** over 2 hours, decompression was used to decompression degree 0.5mmHg.

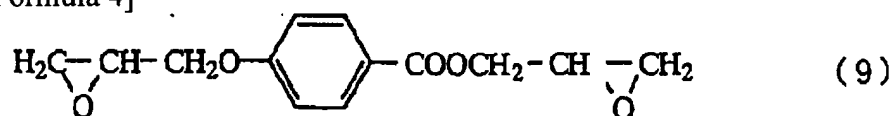
[0048]Then, polymer was breathed out, when it was made to react for about 1 hour and torque became fixed. The intrinsic viscosity measured at 25 ** using the mixed solvent of phenol / tetrachloroethane 1:1 was 1.3.

[0049]The polypropylene terephthalate (B) manufactured by Examples 1-5, the comparative example 1, 2 thermoplastics (A), and a reference example was mixed with the compounding ratio shown in Table 1, and melt kneading was carried out with the melting point of +30 ** of thermoplastics using the 30 mmphi biaxial extrusion machine with a vent. The Sumitomo NESUTARU injection molding machine and the pro mats 40/25 (made by Sumitomo Heavy Industries, Ltd.) were supplied after drying the obtained pellet, and the cylinder temperature was fabricated on with the polymer melting point of +30 **, and a die temperature of 80 ** conditions.

[0050]As shown in Table 2, glass transition temperature in Example 5 as an elastomer 20 ** or less. Glycidyl methacrylate denaturation polyethylene copolymer (the diepoxy compound expressed with a following general formula (9) as the GMA denaturation polyethylene copolymer by the Nippon Oil chemicals company (RA3050) and an epoxy compound was blended.)

[0051]

[Formula 4]



In order to measure the distributed particle diameter of the obtained elastomer in a resin composition, The flake was cut down for the specimen for evaluation using ultramicrotome, a photograph of this was taken using the optical microscope (transmitted light) and the transmission electron microscope, and the average value of 100 populations easily chosen from this microphotograph was measured. As a result, micro-disperse of the distributed particle diameter of the elastomer in a resin composition was extremely carried out to 1.6 micrometers or less.

[0052]A series of combination formulas and a measurement result are summarized in Tables 1 and 2, and are shown.

[0053]

[Table 1]

表1

	(A)熱可塑性樹脂 100重量部	(B)ポリプロピレンワグレート 添加量(重量部)	(C)ガラス繊維 添加量(重量部)	機械特性 引張強度 (MPa)	耐熱性 荷重 たわみ 温度(℃)	耐衝撃性 フット 衝撃値 (J/m)	耐加水分解性
							121℃(100%RH) 30h強度保持率
実施例1	PET	10	30	118	230	120	40%
実施例2	PET	20	30	118	230	130	50%
比較例1	PET	—	30	118	230	98	30%
実施例3	PBT	10	30	147	212	102	60%
実施例4	PBT	20	30	147	212	128	70%
比較例2	PBT	—	30	147	212	88	50%

[Table 2]

表 2

	(A)熱可塑性樹脂 100重量部	(B)ポリプロピレン/アクリレート 添加量 (重量部)	その他の添加剤 添加量 (重量部)	機械特性		耐熱性 荷重 たわみ 温度(℃)	耐衝撃性 アイソット 衝撃値 (J/m)	耐加水分解性 121℃ (100%RH) 30h強度保持率
				引張強度 (MPa)				
実施例 5	PBT	20	ガラス繊維 30 エラストマー 20 エポキシ 20	147	212	150	80	

[0055]Excelling also in an impact property and hydrolysis resistance is clear, PET or PBT which blended polypropylene terephthalate from the above result holding tensile strength and heat resistance.

[0056]It turns out that impact strength and hydrolysis resistance can be raised further, without reducing tensile strength and load deflection temperature, when glass transition temperature adds an elastomer and an epoxy compound of 20 ** or less.

[0057]The resin composition of Examples 6 and 7, comparative example 3 Examples 3 and 5, and the comparative example 2 is used, The connector shown in drawing 1 (the maximum of 55 mm, 13 mm in height, the depth of 37 mm, and 1 mm in thickness) is fabricated by injection molding, The place which compared the time when 110 ** and 95%RH carried out bottom predetermined time neglect of a condition of this at, and the crack occurred, At the connector (examples 6 and 7) using Examples 3 and 5, the crack generation was accepted by the connector (comparative example 3) using the comparative example 2 to not generating a crack for at least 300 hours in 100 hours.

[0058]It carried out like Example 1 except having used N6, PPS, POM, and ABS as four to Examples 8-11 and comparative example 7 thermoplastics. A series of combination formulas and a measurement result are shown in Table 3.

[0059]Since each of these resin was resin which is intrinsically excellent in hydrolysis resistance, even if it blended polypropylene terephthalate of this invention, change was not observed in hydrolysis resistance. However, excelling in an impact property is clear, holding tensile strength and heat resistance by blending polypropylene terephthalate.

[0060]

[Table 3]

表 3

	(A) 熱可塑性樹脂 100重量部	(B) ポリプロピレン/アクリレート 添加量 (重量部)	(C) ガラス繊維 添加量 (重量部)	機械特性	耐熱性	耐衝撃性
				引張強度 (MPa)	荷重 たわみ 温度(℃)	アイソット 衝撃値 (J/m)
実施例 8	N6	20	30	167	215	130
比較例 4	N6	—	30	167	215	108
実施例 9	PPS	20	40	157	>260	128
比較例 5	PPS	—	40	157	>260	98
実施例 10	POM	20	—	61	110	90
比較例 6	POM	—	—	61	110	63
実施例 11	ABS	20	—	70	80	200
比較例 7	ABS	—	—	70	80	150

[0061]

[Effect of the Invention] The thermoplastic resin composition of this invention is excellent in heat resistance, shock resistance, and hydrolysis resistance.